

SUGGESTIONS FOR A PORTABLE INSTRUMENT-
BAG; OPERATING OVERALLS; A BANDAGE FOR
SUPRAPUBIC DRESSINGS; A BLANKET FOR
PROTECTION OF PATIENTS DURING OPER-
ATIONS; A TABLE FOR THE TRENDEL-
ENBURG POSTURE; THE STERILI-
ZATION OF SPONGES; AN ANTI-
SEPTIC SOAP PASTE.

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THE first among a number of original additions to the practical side of surgery, which I beg to offer, is an operating outfit. In presenting the same, I desire to state that the idea of planning an outfit which would meet the approval of every surgeon had never entered my mind. It is more to the general principles involved in the construction of the case than to the instruments that the attention of the reader is invited; for every surgeon will have his likes and dislikes, for and against certain instruments, or against a certain number of instruments which are to constitute such a case.

The principles which should be embodied in an ideal operating case are those of completeness, convenience, portability, and cleanliness; it should be complete in its equipments,—*i.e.*, in keeping with the individual idea of the surgeon; it should be convenient in its arrangement, portable as to its size, and of such construction as to admit of its being kept in a practically sterile condition, that it may at all times be ready for use.

The average bag may possess one or more of these features,

but it is usually deficient as to the number and variety of instruments, or *vice versa*, it is encumbered by an excess in the number of instruments, adding so much weight, that its convenient portability is seriously interfered with.

But a more serious objection than either of these is the difficulty with which the average bag can be kept in a practically sterile condition, and it was to this feature that the most attention was directed in the construction of the present bag.

Upon examination it will be noticeable that everything, with the exception of the satchel itself, can be subjected to heat,

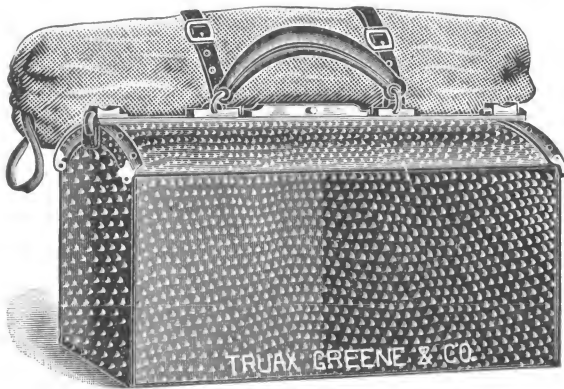


FIG. 1.—External appearance of the operating outfit.

the most potent of all disinfectants. As for the convenience and completeness, that will be left for the reader to decide after reviewing the description and examining the plates, and as to its portability, I will say that it has been upon probation for about two years, during which time no inconvenience was experienced in its transportation.

Illustrative of the capacity of the bag might be added that not long since the writer had an occasion to visit a neighboring State to operate upon an obscure abdominal condition, and in view of this fact a number of unnecessary articles were required to insure a complete outlay.

In the space above the instrument-case, or, in other words, between the box and the lid of the satchel, were carried almost

a dozen smaller instruments, in addition to this, one dozen towels, eight sponges, two extra gowns, an irrigating outfit, and a hypodermic case.

The bag is ordinarily known as the fifteen-inch size. The external appearance, together with the manner of carrying the operating overalls, can be observed in Fig. 1.

Upon opening the bag, the utilization of its space, the convenience of its arrangements, and the ease of its sterilization can be seen at a glance.

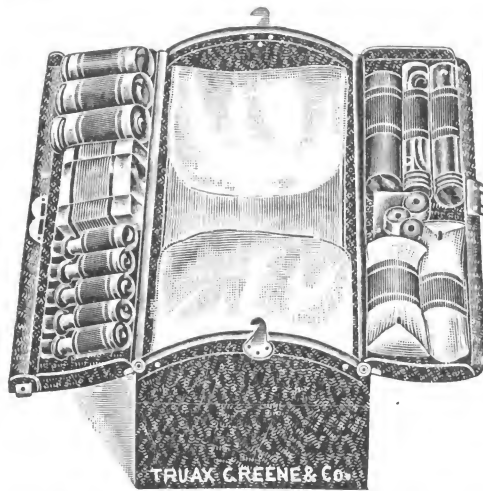


FIG. 2.—Showing interior arrangement of the operating outfit.

The cover, which consists of halves, is supplied upon its inner sides with leather slots for the respective articles. An idea of their character and arrangement can be obtained by a study of the plates.

Upon one-half of the cover nine distinct articles are carried, as follows :

(1) A bottle containing rubber tissue ; (2) a bottle containing rubber drainage-tubes ; (3) a bottle, encased in wood, containing decalcified bone drainage-tubes.

In the middle there is arranged upon a folding plate three sizes of the Murphy buttons,—

(1) A razor protected by a case made of heavy duck ; (2) a nail-brush enclosed in a case of duck ; (3) a mouth-gag.

The opposite half is provided with slots for eleven articles ; beginning at one end, we have five bottles,—

(1) Containing tincture of digitalis ; (2) containing permanganate potash ; (3) containing oxalic acid ; (4) containing ethereal solution bichloride, of such a strength that every four drops represent one grain of the salt ; (5) a bottle containing sal-soda.

The next slot has a small box made of German silver and heavily nickel-plated, for carrying needles and twenty strands of silkworm gut. Following this is another box made of the same material, and likewise plated ; in this is carried a rubber tourniquet ; then comes a box, in which are stored two dozen each of small and medium-size safety-pins. The list is completed by a



FIG. 3.—*a* Aseptic removable lining of the satchel.
b Aseptic box for storing the instruments.

dusting-box of my own design, and, finally, two glass jars with metal screw tops.

In the one is carried castile soap shavings, while the other holds iodoform gauze wrapped upon a reel made of German silver.

The whole kit is protected within the satchel by a shell made of heavy duck, which is kept upright and in a snug position by the means of nickel-plated rods. Each case should really possess a duplicate shell, which is always kept sterilized and ready to take the place of its fellow while it is being cleaned.

The instruments, which with the exception of the handle of a Coghill's modified Hey's saw, are entirely metallic and of the simplest construction, are arranged upon two German-silver frames within a box of the same material, the inside corners of which are carefully filled out with silver, and both the lid and box itself are intended to serve the purpose of immersion-trays, if the occasion should demand. The whole of this is nickel-plated and highly polished. The box and the frames are soldered by means of silver, which enables them to withstand considerable heat if it should be necessary. The lower frame

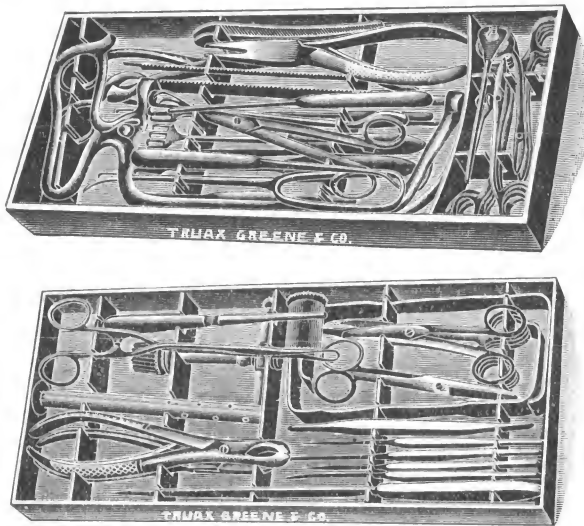


FIG. 4.—Racks for holding the instruments.

is shouldered upon its upper border, which serves as a rest for the corresponding frame above.

The upper frame holds the following instruments: Liston's long knife; Cooper's hernia bistoury; scalpel, small amputating knife; tenotome, periosteal elevator; two blunt retractors, each of double size; one straight scissors and one curved; one straight Allis's acupressure forceps; one broad hæmostatic clamp; one short hæmostatic clamp; one curved scissors, bone forceps; one rongeur, Eastman's aluminum drainage-tube; trephine, one bullet forceps; one Coghill's modified Hey's saw.

The lower rack holds : Eight Tait's hæmostatic forceps ; one groove director, probe, tenaculum ; one vulsellum forceps ; one sequestrum forceps ; two double-size Volkmann's spoons ; two sponge-holders ; two curved pedicle needles ; one Windler's adjustable saw with an extra blade ; one renal hæmostatic clamp (Schachner) ; two sharp retractors ; one needle-holder ; one long needle for suturing abdominal wounds ; one lithotomy staff.

There are several other features in connection with the outfit which merit special attention, one of which is the cleansing of the instruments.

Perfectly bright instruments are the exception rather than the rule in the majority of instrument-bags ; for it is next to



FIG. 5.—External appearance of the ligature reel.

impossible to keep instruments in a highly polished condition for any length of time, if the polishing is done with towels, as it is usually carried out. The quickest, easiest, and best method of polishing instruments is by means of an ordinary jeweller's buffing lathe. This can be procured at a small expense, and will amply repay the possessor in the time and labor that it saves, and the results that it secures. The needles frequently become spotted and sometimes rusty. Whenever this occurs, they are best restored by a little rubbing with fine emery cloth, which can also be used upon the instruments when spotted with rust, which resists the rubbing with moistened pumice stone.

Of all the difficulties in connection with an outfit, there is none so perplexing as the method of carrying suture and ligature material, and it was only after a long and patient study that the one about to be considered was effected. It has now been in constant use for about two years; during this time it has fulfilled the most sanguine expectation.

Upon examination of the text and illustrations, its construction will be apparent.

Fig. 5 represents the external view of the whole complete.

Figs. 6 and 7 represent the inverted view of the interior mechanism of the same.

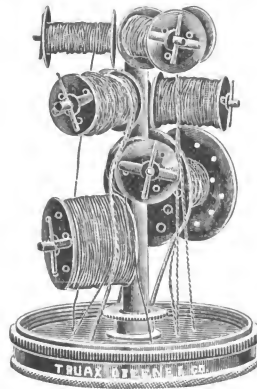


FIG. 6.—Interior arrangement of the ligature reel. Inverted.

(B) The immediate cover of the case. This is supplied with nine perforations for the transmission of the ligatures. Upon its upper or external surface it is plain, with only the perforations and ligatures visible. Against its lower or internal surface rests a rubber disk through which the ligatures are drawn, and which is intended to prevent the leakage of any fluid through the perforations.

(C) Which corresponds with the rubber disk, is held in place at the central point by the flange of the cylindrical section of D.

At its edges it is held by its impingement between the walls

of the container from below and the internal cover of *B* from above.

(*D*).—The cylinder is supplied with threads internally and flanges at its top and bottom. The threads upon its interior, located near the top, are to receive corresponding threads from a short peg arising from the cover of *B*. (Not seen in the plate.) Those near the bottom receive the threads upon the central stem of *E*, and firmly hold it in position. The upper

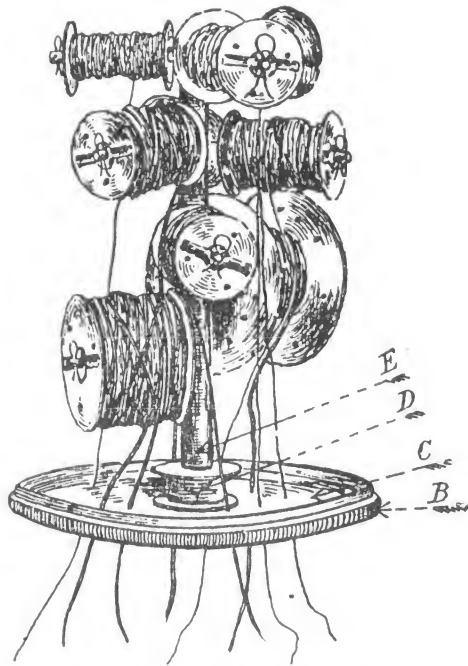


FIG. 7.—Interior mechanism of ligature reel.

flange holds the rubber disk *B* firmly against *A*, and the lower flange performs the functions of a thumb-screw, to be used in adjusting the same.

(*E*).—The central rod gives support to the respective reels, which are held upon their axles by a curved piece of silver wire, performing the function of dowel pins.

As for charging the reel, this is usually effected by the

selection of three sizes of silk; the plaited silk to be used for pedicles, the medium-size silk for pedicles, sutures, and for any other use that may arise, and a third variety, of a very fine character, to be used for intestinal work. The catgut has sizes to correspond with the silk and for the corresponding purposes. In the preparation of the sutures the silk is not subjected to any preliminary handling. The catgut, however, is laid in two successive washings of ether for thirty-six hours each time; to dissolve away the fatty element that interferes with its sterilization. It is then wound upon the proper reels, and the container is filled with absolute alcohol until all the reels are submerged. The whole is then placed in boiling water, and sufficient heat applied to keep the alcohol in a boiling state for about one minute. This is again repeated in twenty-four hours. It is then ready for use, and the container should not again be opened until the reels require replenishing.

In washing the catgut to remove the fat, the ether has been replaced by benzine, but not with the same satisfaction.

Just before beginning an operation, all the strands are slightly drawn out, in order to expose a sterile section of the ligature, and that part that has been exposed is cut away to insure perfectly safe material. Truax, Greene & Co., of Chicago, have undertaken to supply duplicates of this outfit, as described.

Operating Overalls.—The protectives usually worn by operators are open to many objections. Generally the protectives consist either of rubber aprons or gowns, or a combination of a jacket, similar to the kind worn by barbers, and a rubber or linen apron.

The fault to be found with rubber aprons is not alone in the cost of the material and the frequency with which it requires to be renewed; but also in the imperfect manner in which they cover the operator and in the difficulty with which they can be sterilized. For ordinary purposes the white jackets and linen aprons are desirable, in view of their cost, durability, and cleanliness. The objections open to them are that occasionally the operator requires the use of large quantities of water, which, notwithstanding the greatest care, can hardly be managed without

saturating the operator as well as the patient. These objections, however, are overcome by the operating overalls which accompany the outfit.

Upon noticing the plate (Fig. 8), it will be seen how completely the operator is protected from any water or fluids that he may come in contact with during the operation; and from the character of the material of which they are constructed, it is easy to see how readily they can be kept neat, and how they can be kept sterile.

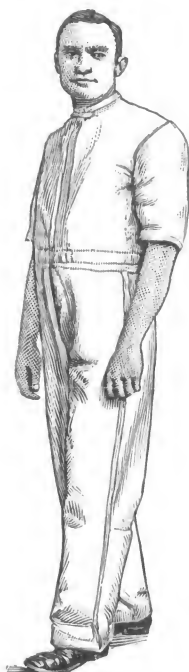


FIG. 8.—Appearance of operating-overalls.

They are prepared somewhat after the under-garments usually worn by children. In the front they are completely closed, while behind they are supplied with a row of buttons extending as far as to a point corresponding to the upper part of the sacrum.

In selecting the quality of duck for making such overalls, care should be taken that too light a grade is not obtained, since, should such be the case, they will hardly possess the necessary

water-proof qualities. Although, owing to the heavy grade of duck, they may be stiff and inconvenient at first, they soon become softened after a few washings.

Suprapubic Bandage.—The bandages and dressings that have been recommended for abdominal sections are both numerous and varied; ranging from the simple abdominal binder to the more complex Scultetus bandage.

Somewhat more than a year ago, the writer performed an oöphorectomy upon an extremely restless patient, whose behavior after the operation was such that no dressing could be satisfactorily kept upon the wound. The only protective that was finally employed consisted of several applications of Liq.



FIG. 9.—Showing the application of the suprapubic bandage and the operating blanket.

gutta-percha, U. S. P. This experience became a pressing incentive for the contrivance of a more satisfactory dressing for abdominal sections performed between the umbilicus and the pubes; and from these efforts resulted the bandage seen in Fig. 9.

Among the advantages of this bandage may be mentioned the cost, since when once used it need not be cast aside, but can be washed and cleaned just like towels and other fabrics.

A second advantage is the ease of its application and the convenience of its adjustment. Finally, it is advantageous in affording the greatest facility for observing and combating the presence and the progress of any distention that may arise during the post-operative period of the case.

The bandage consists, as seen in Fig. 10, of a pad, with tails corresponding to its four corners. When applied, the upper tails snugly encircle the abdomen just above the iliac crests, while the lower pass over the perineum and are pinned to the corresponding side of the encircling band. By means of this bandage the dressing is always kept firmly and evenly applied; since laterally there is no tendency for any displacement, and the perineal bands securely anchor it above and below, preventing the slipping in any of these directions. Should the case require the use of a drainage-tube, a slit can be made in the pad corre-

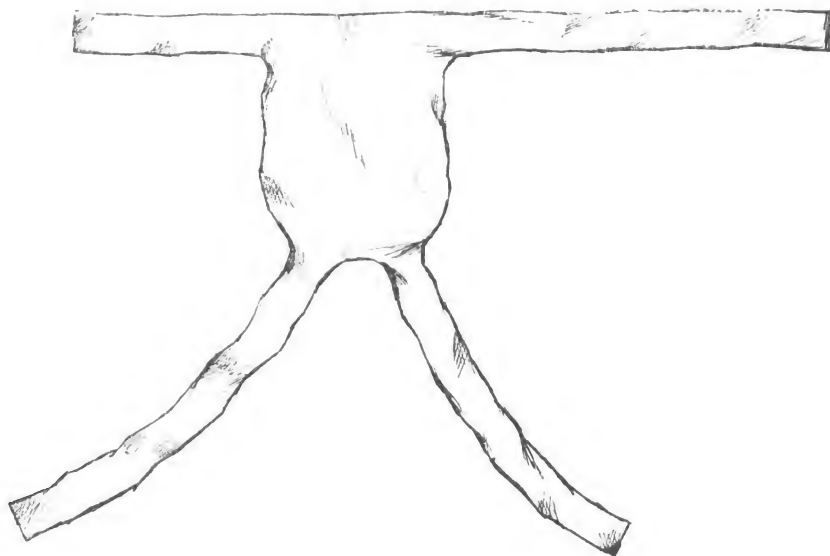


FIG. 10.—Design of suprapubic bandage.

sponding to the position of the tube. In case the operation necessitates an incision extending above the umbilicus, this bandage can be modified to answer the requirements by an extension upward of the pad. This upper-half is held in position by a second abdominal band. The bandage thus modified, however, is not as satisfactory as the one used for suprapubic operations.

Operating Blanket.—It is needless to comment upon the necessity of protecting the patient as much as possible from shock produced by unnecessary exposure to cold and moisture;

and to properly fulfil this requirement is not always as simple as it appears. Not infrequently do we see a patient almost buried beneath a lot of blankets and sheets, arranged in the clumsiest and most inconvenient manner. For a time the writer resorted to the use of leggings and a jacket made of the so-called "silence cloth," as protectives for the patient during the operation. Experience soon demonstrated their impractical nature. Being of

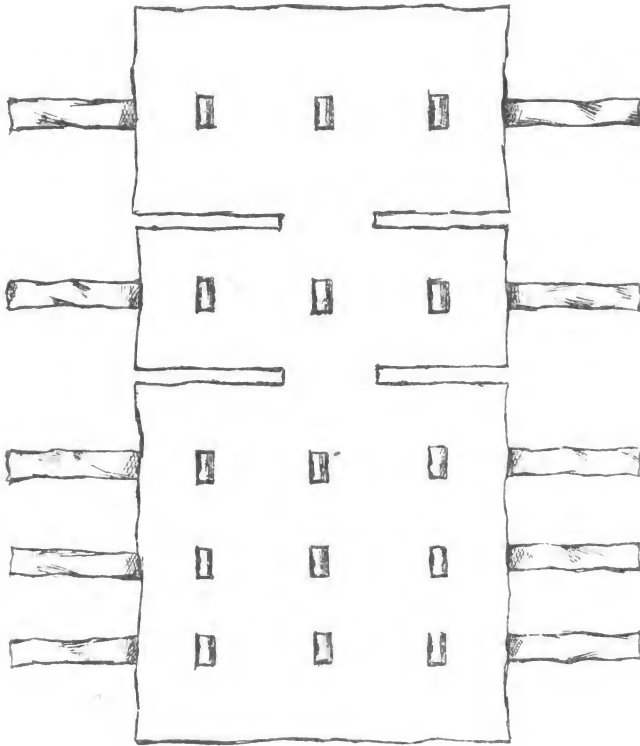


FIG. 11.—Design of operating blanket.

one size only, it was not an uncommon occurrence to encounter subjects that were either too large or too small for a convenient fit. This obstacle was overcome by the use of a blanket, made adjustable to any patient, or to any part of the patient. The design of the blanket can be seen in Fig. 11, and its application in Fig. 9. In the illustration, it is to be observed that it consists

of three flaps, which respectively correspond to the thorax, the abdomen, and the lower extremities. The untying of either of these flaps exposes the corresponding region of the patient. It may be desirable to expose but one leg, in which event the lower flaps are to be wrapped around one, instead of both legs.

Trendelenburg Posture.—One of the most valuable of the recent additions to practical abdominal surgery is the Trendelenburg position. It adds to the safety of the anæsthesia, it militates against shock, and allows the surgeon to perform operative steps under the direct guidance of the eye, which formerly were prac-

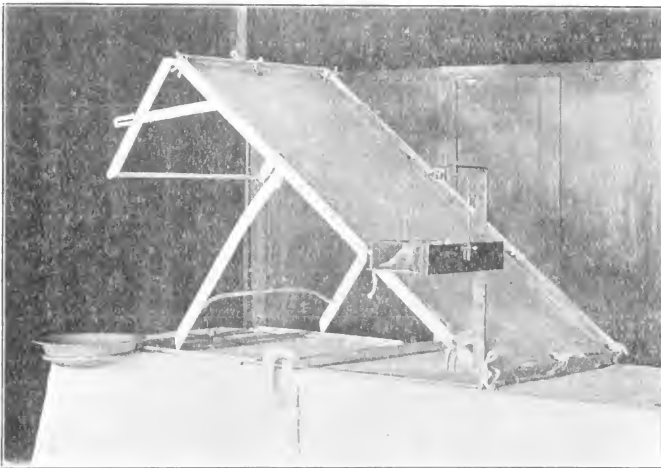


FIG. 12.—Modification of Krüg's Trendelenburg table.

tised by the touch alone. There are hardly any contraindications to its use in operations involving the lower abdominal and pelvic regions.

In pus cases, the position must be carefully employed, lest some escaping pus should infect the entire peritoneal cavity. In such instances it is found best to avoid the elevation, unless the pus is securely enclosed in the Fallopian tube, which can be removed without rupture, or unless the greater portion of the pus has previously been removed by aspiration.

In large abdominal tumors it is always best to keep the

patient in a horizontal position until the tumor has been delivered. Then the patient should be rapidly elevated to avoid any cerebral anæmia which may follow after the sudden removal of a large mass from the abdominal cavity. The necessity of observing this precaution has been demonstrated by actual experience. Some time ago I operated upon a hospital patient who had a large fibromyomatous tumor. The pelvis was elevated about forty degrees, but the woman was not long in this position before the breathing became unnatural and ceased entirely. She was lowered and artificial respiration performed, which restored the breathing. The tumor was delivered and the pelvis again elevated to the same degree for the completion of the operation.

The term "Trendelenburg posture" is used with as much looseness as the expression "antiseptic precautions." For it is not an unusual occurrence to hear of cases reported to have been operated upon in this position, in which the pelvis was elevated but a few degrees to the horizon. Nay, even more than this, we have seen tables of special construction in which the extreme elevation did not exceed more than twenty-five or thirty degrees, instead of forty-five and sixty, as it should have been.

In the accompanying Fig. 12 is seen a modification of Krug's portable Trendelenburg table. The principal difference between this and the one suggested by Dr. Florian Krug is the attachment of the swinging instrument tray and an adjustable ring for the reception of the basin containing the antiseptic solution. These attachments have added largely to the convenience of the table. Upon the right side of the operator are his instruments in a swinging tray; on the left is the ring for holding the basin which contains the antiseptic solution. This ring is under the control of the thumb-screw, which allows it to be pushed forward and backward as may be desired.

Sponges.—There has been a considerable difference of opinion as to the best material for sponging wounds, and with those surgeons who prefer sponges there has been some variance as to the preparation and kind of sponge to be preferred. The kinds usually employed during an operation are the surgeon's silk and the flat or potter's sponge.

In addition to these the author has used with advantage a

third variety, known as the zimmoca sponge. Occasionally, in performing a "planned" operation for an abdominal tumor, it becomes necessary to flush the cavity with large quantities of water. In such instances the saving of time is always of the greatest desideratum, and considerable time can be saved by the use of a good-sized and properly-disinfected zimmoca sponge. Its bulk and extreme absorbing capacity render it especially useful in "bailing out" the abdominal cavity. In addition, a sponge of this size and character has been found useful in rapidly packing a small cavity to absorb any capillary oozing and any pus or secretion that may be encountered during the progress of the operation.

It has been a custom with me never to use the same sponge or set of sponges twice, for it has always seemed very illogical that we should lay down hard and uncompromising conditions for the construction of a surgical instrument,—*i.e.*, simplicity; and that we should recognize but one agent as possessing sufficient potency for the proper sterilization of the instrument,—*i.e.*, heat; and still find justification for the repeated use of the same sponge, even though it be treated by any of the recognized methods. In its structure it is a direct violation of the first condition, and from its nature it is unfitted to be exposed to heat for its sterilization.

The question of cost may be raised against the practice of using sponges but once. This objection, however, depends entirely upon the kind of sponge selected, for it would be an expensive practice to use a fresh lot of silk sponges for every surgical operation. The cost of using sponges but once can be reduced to the minimum by employing the so-called "grass sponges." This is a cheap but a very excellent variety of sponge. In texture it is not as strong as the silk sponge, but it is sufficiently strong, even after passing through a bleaching process, to answer all the purposes of a single operation; and in regard to its softness and absorbing powers it is fully equal to the best silk sponge.

The plan which I have pursued for some time has been to use nothing but carefully-prepared grass sponges. In preparing these sponges, they are properly selected and freed of any traces of sand and *débris* that they may contain. They are then washed

and bleached either by the use of chlorine water or more conveniently by the successive baths of permanganate, oxalic acid, and hyposulphite of soda.

It must be remembered that any sponge is weakened by passing through a bleaching process; and this is all the more to be borne in mind in the preparation of the grass sponges.

It is also very important to carefully avoid the use of a strong solution of permanganate of potash, which has a destructive effect, not alone upon the organic impurities in the sponge, but also upon the texture of the sponge itself. Finally, a large number should not be prepared at one time, for, when they are kept long after having been bleached, they show the destructive effect of the permanganate.

Soap Poultices.—There is hardly a more unsatisfactory feature about an operation than the usual soap poultice. The principal reason for this is that the soft soap that is generally found in the market is prepared by those who have had but little or no experience of practical soap-making. The consequence is that a perfectly neutral compound is very seldom obtained, for, usually, the finished product contains an excess of alkali, which makes it very caustic for the purposes of a poultice.

In fact, I have more than once ordered a soap poultice to be applied the night preceding an operation, and upon returning in the morning found the whole surface red and excoriated from the effect of the strong soap.

As a substitute for the soft soap, the writer has been using an antiseptic soap paste, which is made as follows: A bar of the so-called "ivory" soap is reduced to shavings by paring it with a kitchen knife. The parings are covered with soft water and allowed to stand for twenty-four hours. At the end of this time the magma is thoroughly kneaded with the hands and forced through a sieve having about twenty meshes to the linear inch. If it is not uniformly smooth, this is repeated until the soap passes through as a soft uniform paste. With this is incorporated by a kneading process one gramme each of boric acid and bolted corn-meal to every eight grammes of pulp.

The addition of the corn-meal furnishes sufficient grit to thoroughly remove all particles of dirt.